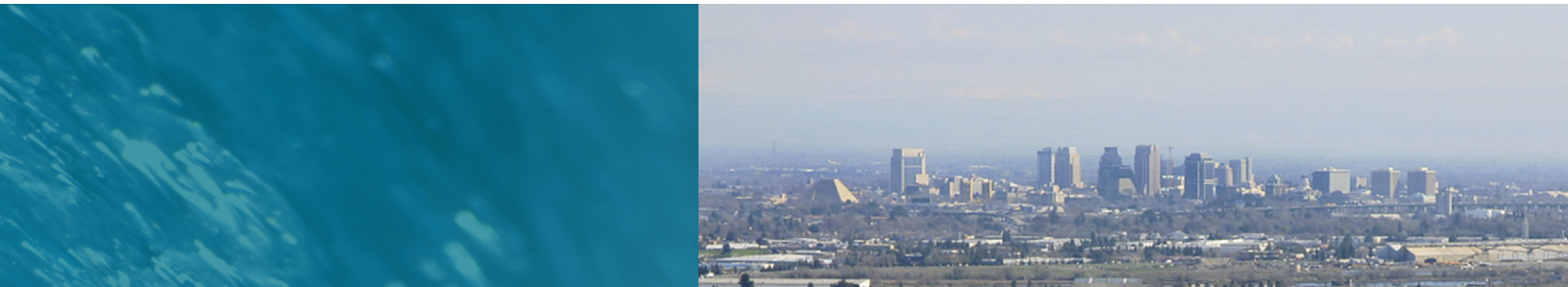


VOLUME 1 - THE STRATEGIC PLAN
CHAPTER 1

Planning for Environmental, Economic, and Social Prosperity





Vic Fazio Wildlife Preserve at Sacramento.

This natural flood control channel contains wetlands; vernal pools; grazing for cattle; winter rice field habitat for waterfowl, birding, educational tours, and hunting; and provides safety and flood protection for homes and valuable business assets.

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Chapter 1. Planning for Environmental, Economic, and Social Prosperity

About This Chapter

The California Water Plan (CWP) is the State’s strategic plan for managing and developing water resources statewide for current and future generations. The CWP is required by the California Water Code but does not create mandates or authorize funding. This chapter provides an overview of *California Water Plan Update 2013* (Update 2013), the 11th in a series of such plans prepared since 1957. Specifically, the chapter begins with a summary of the water resource issues facing the State — a call for action. The remainder of the chapter summarizes major concepts that advance this plan beyond *California Water Plan Update 2009* (Update 2009), significantly advancing the State’s commitment to integrated water management (IWM).

Figure 1-1 illustrates the role of the CWP in supporting informed decisions about the future of California’s water resources. Since the CWP does not create mandates or authorize funding, policy-makers and other water leaders must take the next steps to prioritize investment and authorize funding to achieve results.

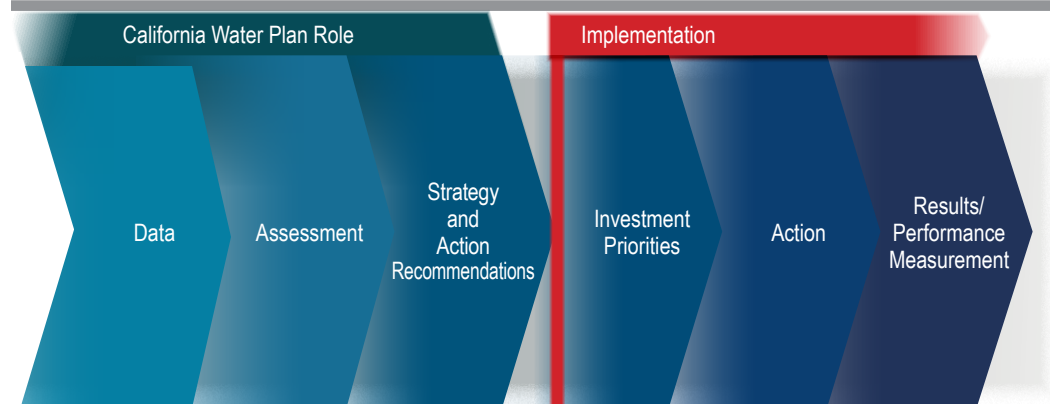
Readers are encouraged to review “Navigating Water Plan Update 2013” within this volume to learn more about the organization of the various contents and topics contained in Update 2013.

A Call for Action

Despite significant physical improvements in water resource systems and in system management over the past few decades, we still face unacceptable risks from flooding, unreliable water supplies, continued depletion and degradation of groundwater resources, and habitat and species declines. Our interconnected system for using and managing water is extremely complex and subject to continually changing natural and human-made conditions. Moreover, our water resources provide critical support for the success of other dynamic systems: our ecosystems, social systems, and economic and market systems. Many of California’s ecosystems and much of our water supply and flood protection infrastructure are no longer functioning properly or have exceeded their life cycles. For example, many communities depend on aging water supply and flood management infrastructure badly in need of maintenance or replacement; many essential species and ecosystems are rapidly declining; and some Californians do not have access to safe, clean drinking water. To compound the situation, such stressors as climate change, earthquakes, and lack of stable funding further threaten the integrity and reliability of the state’s water supply, flood protection, and environmental systems.

Collectively, our biggest problem may be how we pay for necessary water resource management improvements. Past successful investments in water use efficiency, groundwater management, flood management, ecosystem improvements, and many other important resource management actions have provided a down payment and a good basis for further improvements. However,

Figure 1-1 Integrated Water Management Planning and Implementation



State government investments in our water resources have not been stable or effective enough to maintain, much less improve, our personal safety, financial stability, and way of life. Given the current global financial problems, strapped government budgets (local, State, and federal), and the State's high indebtedness and reduced ability to pay, it is unlikely that California can afford all necessary system improvements. Prioritization that reflects our values will be the key to making investments.

California still depends on many remnants from World War II-era investments and innovations. This practice is borrowing against opportunities for the prosperity of current and future generations. If this practice continues, some degree of foreclosure on our future prosperity will occur in the form of societal catastrophes, such as floods, droughts, and species/habitat extinction. Because our water resource system is very complex, making further improvements is complicated by several issues and challenges. Some of these issues and challenges apply statewide and others apply only to certain areas of the state:

- A growing population, which may increase flood risk and water demands.
- Diversity in societal needs, priorities, and expectations.
- Habitat and species declines.
- Degraded surface water and groundwater quality.
- Declining groundwater levels.
- High groundwater depletion rates (and resulting land subsidence) in some areas of the state.
- Sustained drought conditions in the western United States.
- Seasonal, year-to-year, and geographical variability between water sources and locations of water uses.
- Uncertainties about current and future climate change impacts on floods, groundwater and surface water supplies, ecosystems, and sea level.
- Aging and obsolete water infrastructure.
- System maintenance that has been deferred because of lack of funding or difficulty in meeting regulations.
- Sporadic funding that ebbs and flows with the occurrence of floods or droughts and that lacks the predictability and reliability required for effective implementation.

- General Obligation (GO) bond debt levels that are near an all-time high.
- Misaligned, complex, and often internally inconsistent government planning, policy, and regulation.
- Conflicting roles and responsibilities related to overlapping and narrow authorities and governance.



These issues place significant risks on public safety, unique ecosystems, and the vital California economy. Everyone in California is affected to some degree by these issues and will benefit from system improvements that reduce impacts. For example, even if a given home is not inundated during a flood, the home's owner may not be able to get to work or may experience a disruption in services. Also, as ratepayers and taxpayers, California's citizens are affected by damages and business disruptions as the State invests to recover from the disaster.

The stakes are immense, as future investment decisions will significantly affect:

- Types and levels of economic activity (including the fates of existing businesses, as well as the fates of employees and their families).
- Future levels of flood risk to people's lives and assets.
- The sustainability of natural resources (including the potential prosperity or extinction of species/habitats and the ecosystem services they provide society).
- The sustainability and efficiency of surface water reservoirs and groundwater basins to provide reliable water supply to meet municipal and agricultural demands, and support ecosystem services.
- California's \$2 trillion economy, which has significant value both nationally and globally but is dependent on effective local, State, federal, and private natural resource policies and practices.

In recent years, regional and local entities have been investing in water resources management at a rate of about \$18 billion per year. This constitutes the majority of the statewide investments, which total about \$22 billion per year in local, State, federal, and private expenditures (more information and citations to source materials can be found in Chapters 2 and 7 within this volume and in Volume 4). This regional focus for water resource planning and implementation begs for a better definition of the role of State government in supporting regional activities and in promoting statewide policies and initiatives that recognize differences in needs from region to region. Investments in innovation and infrastructure (water and flood systems, as well as ecosystems)

need to focus on regionally derived, multi-objective actions; consider all resource development costs; and be fairly allocated among beneficiaries.

State, federal, and local agencies need to step up efforts to enhance California's business and finance climate by increasing the certainty that flood damages will be averted, that surface water and groundwater supplies will be reliable and predictable, and that recreational opportunities and environmental sustainability will be improved. Beginning with the three themes presented in the next section, Update 2013 provides a guide for strategic planning and investment that helps planners and policy-makers overcome the complicated physical and institutional barriers to effective water resource management described earlier in this chapter.

Themes for Update 2013

Update 2013 contains a large variety of information, in five volumes. Although these volumes contain many refinements from Update 2009, Update 2013 also has significantly advanced the State's strategic plan in three critical areas. To address challenges and build upon past successes, Update 2013 focuses additional planning and recommendations regarding (1) IWM, (2) government agency alignment, and (3) strategies to invest in innovation and infrastructure.

These three topics can be considered themes for creating the strategic plan contained in Update 2013 (see Figure 1-2). These themes are interconnected and are never considered separately. IWM provides a set of principles and practices that include government agency alignment (and hence efficiency) through a collaborative and transparent planning process. This leads to stakeholder and decision-maker support for focused, cost-effective investment in various aspects of resource management. The Update 2013 strategic plan embraces these three themes as the basis for developing tools, plans, and actions and achieving results. Society's willingness and ability to pay for all government functions and services is decreasing, so these themes do not necessarily call for increased investment so much as for smarter, more efficient, and more effective planning and investment.

The following sections provide a summary of each of the three themes that advance Update 2013 beyond Update 2009.

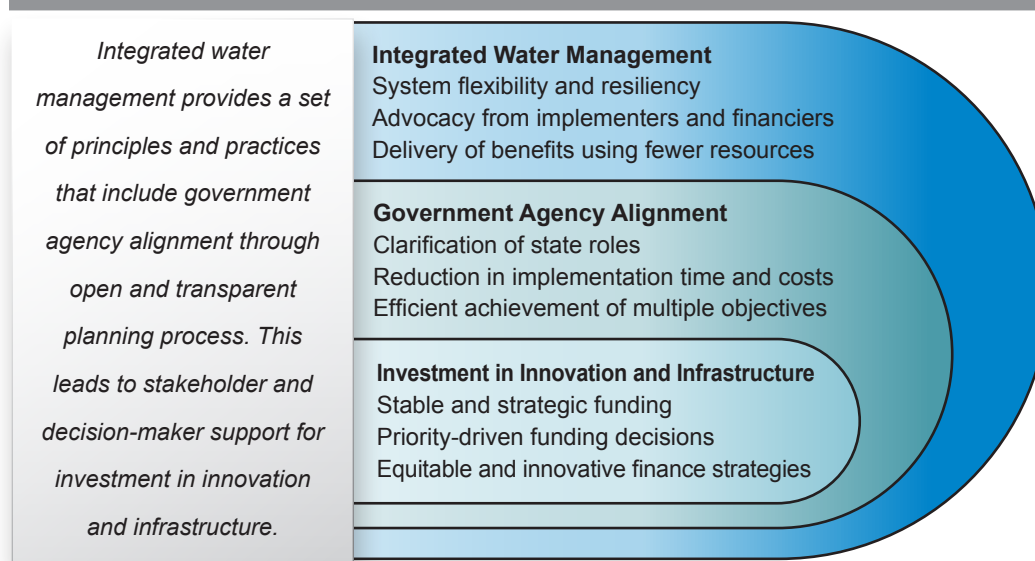
Integrated Water Management

The first theme for Update 2013 is to build upon the foundation for IWM presented in Update 2009. IWM is a strategic approach to planning and implementing water management programs that combines flood management, environmental stewardship, and surface water and groundwater supply actions to deliver multiple benefits across watershed and jurisdictional boundaries.

IWM and integrated regional water management (IRWM) practices have made strides over the past 10 years, and Update 2013 encourages continuation and expansion of these practices. Chapter 2 of this volume, "Imperative to Invest in Innovation and Infrastructure," elaborates on the application of IWM in prioritizing future investments.

Houses near a levee on the Sacramento River, with the Delta in the background.



Figure 1-2 Themes of California Water Plan Update 2013

Update 2013 further clarifies and defines (using an outcome-based approach) the scope and focus of multi-objective IWM. Key IWM outcomes include improved system flexibility and resiliency, increased advocacy for multi-benefit projects from potential implementers and financiers, and delivery of benefits at a faster pace, using fewer resources than is possible from single-benefit projects. While IWM seeks to leverage multiple benefits and partners, IWM does not promote the exclusion of single-purpose projects. In many localities, such projects can and do deliver cost-effective benefits.

Government Agency Alignment

The second theme for Update 2013 is to improve government agency alignment, a key process necessary for successful IWM. Update 2013 includes alignment strategies and actions to build on this concept that was introduced in Update 2009.

The primary purpose for better aligning local, State, and federal government agencies is to expedite the implementation of resource management strategies (RMSs) (see Volume 3) and help ensure efficient achievement of multiple objectives. This includes collaboration with regulatory agencies to reduce the time and costs required to implement IWM projects. Alignment would not alter agencies' authority or responsibility, but it would facilitate agencies working better together.

Currently, project implementers must navigate and comply with California's labyrinth of laws and regulations, developed by multiple agencies that sometimes operate in silos. This can lead to project delays and mounting planning and compliance costs. These challenges ultimately create significant difficulties in meeting basic community safety and water supply needs and also create difficulties in meeting the goals outlined in the CWP. It is important to acknowledge that regulations also provide basic community safety and water supply needs and help meet many CWP goals. Update 2013 promotes innovation for all IWM tools, including regulation and administrative tools.

At the same time, planning a project within the current regulatory environment is very technically and administratively complex, making it difficult for a single entity to comprehend all aspects of resource management and planning. For example, California has a wide variety of climates, landforms, and institutions, as well as a very diverse, place-based range of cultures that can best be described as constituting *anthrodiversity* (e.g., the human aspect of biodiversity that denotes the public interest and value of varied human habitats, such as rural, suburban, and urban communities). (For more information, see Chapter 3, “California Water Today,” in this volume.) Accordingly, data management, planning, policy-making, and regulation must occur in a very collaborative manner, with the ultimate product being a composite of input and data from a large variety of elected officials, influencers, stakeholders, scientists, and subject experts.

Strides have been made to improve alignment, such as the formation and engagement of the CWP’s State Agency Steering Committee and Federal Agency Network and of 48 regional water management groups. However, local, State, and federal governments simply do not collaborate enough (and hence are often not aligned) to effectively manage the complexities described above. Impacts of insufficient alignment include the fact that planning and permitting of projects frequently exceed the implementation and operational costs for many infrastructure and ecosystem enhancement activities. In many cases, program and project implementation have yet to occur despite decades of planning activities.

Government agencies must institute a more coordinated, crosscutting, outcome-based, and regionally appropriate approach to achieve desired outcomes. The Update 2013 process was also designed to provide timely and meaningful participation by stakeholders. Update 2013 continued to develop new efforts to communicate, share information, and obtain feedback from California Native American tribal governments, federal agencies, topic-based caucuses, communities, academia, individuals, and organizations.

Investment in Innovation and Infrastructure

The third theme for Update 2013 is to create more stable and disciplined/strategic investment in innovation and infrastructure. A stable, effective funding stream is an essential component for successful water resource implementation. One of the most significant new features of the Update 2013 is a description of principles and strategies for future water financing.

The California Department of Water Resources has determined that, statewide, nearly \$600 billion in assets and more than 7 million people are at risk of flooding. There are also several thousand water supply projects and other types of projects identified within the 48 IRWM plans, urban water management plans, and capital improvement plans. In total, resource management actions would require hundreds of billions of dollars of investment over the next few decades to reduce flood risk, provide reliable and clean water supplies, reverse degraded and declining groundwater basins and contain localized and regional land subsidence, and enhance ecosystems and their services. Funding for these investments remains fragmented, unstable, and inefficient, which limits opportunities for further integration. In addition, GO bond debt is near record levels.

Instead of the traditional desalination approach used to treat seawater, Water FX cleans water through use of a Concentrated Solar Still. It uses existing technology, adapting 400-kilowatt parabolic solar troughs originally designed for power generation.



In this volume, Chapter 3, “California Water Today,” details existing local, State, and federal IWM spending and debt levels. Historically, projects that tend to be the most implementable, the most consistent with priorities of a particular funding source — or that happen to be at the front of the queue when money becomes available — were often not linked to multifaceted strategic objectives. The approach used for Update 2013 promotes proactive planning and prioritization of activities to drive future investment decisions and funding. See Chapter 7 of this volume, “Finance Planning Framework,” for a description of finance strategies, including GO bonds, fees, taxes, and public private partnerships.

Two primary categories of investment are innovation and infrastructure. Innovation includes planning and prioritization improvements, such as the development of new analytical tools. Infrastructure includes structures and facilities that support human activities, but it also includes green infrastructure (e.g., wetlands, riparian habitat, and watershed systems). Both innovation and infrastructure must include initial up-front costs and long-term operation and maintenance costs, which have often been an afterthought to implementation and not adequately financed over a project’s useful life. Although innovation investments would help make better decisions and guide infrastructure investments, innovation would cost orders of magnitude less than infrastructure. This indicates that strategic investment in innovation can produce a very high return on investment over the long term by identifying the most cost-effective, robust, and beneficial solutions prior to making large capital investments.

Through intensive collaboration with the Update 2013 Finance Caucus, the investment categories presented in Box 1-1 helped participants toward a common understanding of potential investments. This approach can be used for aligning funding and finance planning processes across more than 2,300 local, State, and federal government agencies, each with its own planning processes and scales.

Guide to Update 2013 Documents — Foundational and New Features

California Water Plan Update 2005 (Update 2005) marked a change in how the State prepared the CWP. For the first time, the document included a strategic plan prepared in a collaborative process that brought together DWR with an advisory committee representing urban, agricultural, and environmental interests. Update 2005 was the first CWP to explicitly include a strategic plan with a vision, a mission, goals, recommendations, and an implementation plan. Update 2009 updated and expanded these strategic plan elements. Update 2013 further updated the strategic plan.

Since the structure of these previous plans has proven useful, several foundational components have been continued for Update 2013 (see Figure 1-3). Foundational components include topics required by statute, as well as recurring features that were identified by stakeholders and CWP users as useful and important to maintain continuity across updates. All volumes contain material that has been updated since Update 2009 was released.

Update 2013 presents the strategic plan in Volume 1. Within it, **Chapter 2, “Imperative to Invest in Innovation and Infrastructure,”** elaborates on the three themes introduced in Chapter 1 and describes the conditions and challenges that constitute an urgency to act. It also lays out the future role of State government in IWM. **Chapter 3, “California Water Today,”** includes

Box 1-1 State Integrated Water Management Investment Categories

Innovation:

- Governance of State integrated water management (IWM) improvements.
- Planning and public engagement improvements.
- Strengthening government agency alignment.
- Information technology (data and analytical tools) improvements.
- Water technology and science advancements.

Infrastructure (human and ecosystem), implemented at the following scales:

- Local.
- Groundwater basin.
- Watershed.
- Regional.
- Interregional.
- State.
- Interstate.
- International.
- Tribal.

a comprehensive description of current conditions, challenges, and initiatives for managing California’s extreme and variable resources. Chapter 3 also details water uses and supplies (water portfolios) on a statewide basis. Moreover, a central feature of Update 2013 is the oversight of a 28-member State Agency Steering Committee. The steering committee’s membership represents the complex and many-faceted nature of governing California’s water resources at the State level. The committee’s participation helped identify companion State plans that have a direct connection with the CWP, as discussed in **Chapter 4, “Strengthening Government Alignment.”** The approach to defining and examining numerous future resource management scenarios through 2050 is outlined in **Chapter 5, “Managing an Uncertain Future.”** Chapter 5 summarizes potential future water demand and supply conditions and evaluates the use of RMSs for three hydrologic regions (RMSs are covered in Volume 3 of Update 2013, and California’s hydrologic regions are covered in Volume 2). **Chapter 6, “Integrated Data and Analysis: Informed and Transparent Decision-Making,”** contains information and data analysis, as well as key actions, needed to improve and implement strategies for use of water resources. **Chapter 7, “Finance Planning Framework,”** a new part of Update 2013, presents an approach for prioritizing State IWM investments, the role of State government and public funding, an estimate of future investments, and several strategies for financing improvements. **Chapter 8, “Roadmap For Action,”** sets forth the strategic vision, goals, objectives, and principles that guided the preparation of Update 2013 and that provide the ideals for its implementation. This chapter also describes the future actions required to implement Update 2013 and related IWM plans.

Figure 1-3 Foundational Components of California Water Plan Update 2013

Strategic Plan Volume 1	<ul style="list-style-type: none"> • Goals, Objectives and Related Actions • State and Federal Companion Plans • Water Portfolios • Future Scenarios
Regional Reports Volume 2	<ul style="list-style-type: none"> • Reports for 10 Hydrologic Regions • Reports for 2 areas with common water interests
Resource Management Strategies Volume 3	<ul style="list-style-type: none"> • Reports for 30 resource management strategies
Reference Guide Volume 4	<ul style="list-style-type: none"> • Detailed reference material related to information presented in Volumes 1, 2, and 3
Technical Guide Volume 5	<ul style="list-style-type: none"> • Web portal to document assumptions, data, analytical tools, and methods

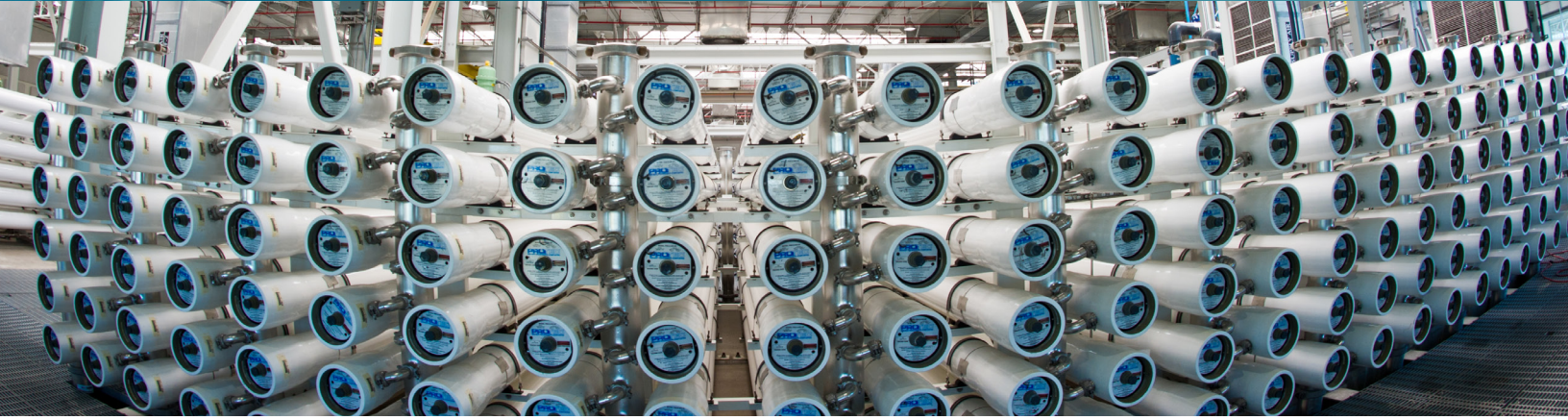
Enhancements to Update 2013 — Adapting to Changing Decision-Support Needs

Update 2013 builds on and advances the evolution in planning that began with the Update 2005 process. As described earlier in this chapter, the major enhancements for Update 2013 compared with Update 2009 are the emphasis on the three overarching themes of IWM, government agency alignment, and investment in innovation and infrastructure.

In addition, during the Update 2013 scoping process in 2010, the many advisory bodies and the public suggested enhancements for Update 2013. The suggestions can be broadly grouped into five categories, for improvements in:

- New and expanded topics.
- Regional planning.
- Collaboration.
- Data, metrics, and analyses.
- Adaptive management.

Detailed descriptions of each proposal are provided in Volume 4, *Reference Guide*. Although all proposals for enhancements could not be accommodated within the scope of Update 2013, they serve as a starting point for scoping the next update of the CWP, to be released in 2018.



Orange County Water District (OCWD) manages the large groundwater basin that provides reliable, high-quality groundwater to 19 municipal and special water districts that serve 2.4 million customers in northern and central Orange County.

After an extensive collaborative process of screening and prioritization, the following enhancements for Update 2013, identified as critical for ensuring relevant and useful decision support, have been incorporated into the strategic plan by Update 2013 staff and stakeholders.

- New and expanded topics:
 - **Finance planning framework.**
 - Critical State investment priorities for water supply, water quality, flood planning and management, and environmental stewardship activities were identified.
 - Innovative, stable, equitable, and fiscally responsible financial strategies and revenue sources were recommended.
 - **New resource management strategies (RMSs)** — New RMSs were added for sediment management, outreach and education, and water and culture.
 - **Flood management** — Flood management, in the form of IWM, was incorporated throughout the CWP. This effort included thorough incorporation of the report California's Flood Future: Recommendations for Managing the State's Flood Risk, which presents a call to action and recommendations for reducing flood risk statewide.
 - **Surface and groundwater quality** — Regional and statewide water quality challenges were highlighted, and strategies were recommended to protect and improve water quality to safeguard public health and the environment and to improve water supply reliability.
 - **Groundwater conditions and management** — Data, basin descriptions, and other information about statewide and regional groundwater conditions and change in storage were expanded, and existing groundwater governance structures were evaluated for better understanding of groundwater management alternatives and, ultimately, more informed decisions.
 - **Water technology and science** — Information was identified and expanded relating to statewide and regional water technology needs, opportunities, and challenges for implementing new technologies in California. Development of Update 2013 was supported through in-depth discussions and deliberations of innovation, technology, applied research, science, and development topics and issues.
- Regional planning:
 - **Emphasis on planning at a regional scale** — Regional outreach was expanded, the scope of regional reports was broadened to include regional RMSs, and recognition of IRWM plans and priorities was increased.

- **Near-coastal resources** — Topics and issues were added to include near-coastal interfaces with regard to several issues with a nexus to the management of fresh water, such as: desalination brine disposal, the influence of freshwater runoff in near-coastal ocean environments, and the interface of ocean and freshwater habitats (i.e., anadromous fisheries).
- Collaboration:
 - **Expanded outreach and collaboration** — Seven topic-based caucuses were established, a Federal Agency Network was launched, five State agencies were added to the State Agency Steering Committee, and a new Tribal Advisory Committee was formed.
- Data, metrics, and analysis:
 - **Sustainability indicators** — An analysis framework was developed to identify, compute, and evaluate sustainability indicators that would help monitor progress toward reaching the goals and objectives of Update 2013.
 - **Improved data, metrics, and analysis methodologies** — Data and methods for quantifying alternative scenarios of future water demand and supply conditions were improved and were used to evaluate the performance of potential water management responses for Update 2013.
- Adaptive management:
 - **Update 2013 Progress Report** — A new, mid-process progress report was added, to assess progress on Update 2009 recommendations and suggest areas of focus for Update 2013.
 - **Climate change** — Greater detail and more regionally specific climate change information was provided for Update 2013 than was provided within Update 2009. This included regionally appropriate and statewide adaptation and mitigation strategies, RMSs, and climate change scenario decision support.

Progress Toward Implementing Update 2009 Objectives

Update 2009 included an “Implementation Plan” chapter with objectives and related near- and long-term actions. By statute, the CWP has no powers to mandate that its recommendations be funded or implemented. The plan must be furthered by agencies or voting bodies that can implement its tools, plans, and actions. IWM entities at the local, State, and federal level have initiated and completed many of these actions, and they continue to make progress on other actions. Generally speaking, notable progress includes better interagency communication and collaboration, improved understanding of climate change, and new analytical approaches and tools to help manage resources into the future.

Progress toward implementing Update 2009 is detailed in the Update 2013 *Progress Report* (Progress Report). The Progress Report assessed whether and to what extent the 13 objectives (and 115 related actions) of Update 2009 have been implemented. It also identified key implementation impediments, as well as better ways to articulate more measurable objectives for Update 2013. This information can be used to direct the attention and resources of decision-makers, planners, and stakeholders to actions that are not progressing. The Progress Report also helped make Chapter 8, “Roadmap For Action,” of Update 2013 more implementable and measurable (for reporting in the Update 2018 Progress Report). Table 1-1 is a summary of progress on the implementation of Update 2009 objectives and actions from the Progress Report.

Table 1-1 Progress Report on Implementation of Update 2009

Update 2009 Objective	Status	Trend
1. Expand Integrated Regional Water Management	Good	Neutral
2. Use and Reuse Water More Efficiently	Requires attention	Good
3. Expand Conjunctive Management of Multiple Supplies	Requires attention	Good
4. Protect Surface Water and Groundwater Quality	Requires attention	Good
5. Expand Environmental Stewardship	Requires attention	Neutral
6. Practice Integrated Flood Management	Good	Good
7. Manage a Sustainable California Delta	Good	Good
8. Prepare Prevention, Response, and Recovery Plans	Neutral	Requires attention
9. Reduce Energy Consumption of Water Systems and Uses	Neutral	Neutral
10. Improve Data and Analysis for Decision-making	Good	Good
11. Invest in New Water Technology	Good	Good
12. Improve Tribal Water and Natural Resources	Neutral	Requires attention
13. Ensure Equitable Distribution of Benefits	Unavailable	Unavailable

In addition to progress made specifically toward implementing the Update 2009 objectives and related actions, many related significant accomplishments have been made or are ongoing since 2009. For example, the 2009 water legislation package (described further in Chapter 3 of this volume, “California Water Today”) represents major steps toward ensuring a reliable water supply for future generations, as well as restoring the Delta and other ecologically sensitive areas. There has been significant progress in implementing this legislation. Regional water management groups and water communities have continued to advance IRWM through the development of 48 regional planning entities, and since 2009 a large portion of the more than \$10 billion in State GO bonds has been invested in IRWM activities. State agencies have continued to seek alignment of data, plans, policies, and regulation. Almost universally across all programs, data and technology have greatly improved Californians’ ability to better manage water resources and plan for future improvements. More complete descriptions of implementation progress can be found in the Progress Report; in Chapter 3, “California Water Today”; in Chapter 4, “Strengthening Government Alignment”; and in Volume 4, *Reference Guide*.